

Table of Excessive, Greatest, and Least Monthly Rainfalls.—Continued.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration.	Amount.	Station.	Amt.
<i>Pennsylvania.—Continued.</i>						
Grampian Hills.....				6.17		
Blooming Grove.....	26, 27	4.30		6.10		
Dyberry.....	18	2.20				
Do.....	26, 27, 28	3.00				
Easton.....	26, 27	2.25				
West Chester.....	27	2.23				
<i>South Carolina.</i>						
Allendale.....				11.33		
Georges.....				8.63		
Cheraw.....				7.54		
Columbia.....				6.18		
<i>Tennessee.</i>						
Near Alexandria.....				8.32		
Murfreesborough.....				7.56		
Hardison's Mills.....				7.52		
Florence Station.....				7.08		
Austin.....	10	2.25		6.82		
Biddleton.....				6.82		
Manchester.....				6.52		
Brownsville.....				6.43		
Flat Creek.....				6.34		
Grand Junction.....				6.21		
Pulaski.....				6.08		
Savannah.....				6.08		
Howell.....				6.03		
Memphis.....	22	2.16				
<i>Texas.</i>						
Sour Lake.....				7.59		
Houston.....				7.32		
Rio Grande City.....	27	3.00		6.82		
Palestine.....	3	3.68	3 h. 14 m.	6.33		
<i>Virginia.</i>						
Marion.....				7.05		
Norfolk.....	13, 14	3.77		6.52		
Cape Henry.....	13, 14	3.52		6.14		
Wytheville.....	10	3.00				
<i>West Virginia.</i>						
Helvetia.....				6.55		
<i>Wisconsin.</i>						
Madison.....	2, 3	3.35		7.59		
Columbus.....				6.14		
Ripon.....	11	2.08				
Franklin.....	11	2.00				

Hail-storms of less violence have occurred in the various states and territories as follows:

Colorado.—West Las Animas, 3d; Fort Collins, 15th; Pike's Peak, 24th; Fort Lewis, 30th.

Dakota.—Bismarck, 4th; Fort Yates, 4th; Huron, 15th; Fort Sully, 17th; Fort Meade, 21st.

Delaware.—Delaware Breakwater, 19th.

Georgia.—Augusta, 14th.

Illinois.—Anna, 10th; Collinsville, 15th.

Indiana.—Wabash, 6th, 17th; Indianapolis, 10th; Vevay, 12th; Griffin Station, 16th.

Iowa.—Guttenburg, 11th; Indianola, 11th; Fort Madison, 15th; Independence, 16th.

Kansas.—Wellington, 5th; Salina, 5th, 12th, 24th; Yates Centre, 23d; Clay Centre, 23d.

Maryland.—Fallston, 10th.

Massachusetts.—Dudley, 6th, 7th; Somerset 13th.

Michigan.—Litchfield, 2d.

Minnesota.—Moorehead, 5th; Saint Paul, 7th.

Missouri.—Saint Louis, 15th; Curryville, 16th.

Montana.—Billings, 4th; Fort Ellis, 11th.

Nebraska.—Johnson, 1st; Table Rock, 1st; Stella, 1st; North Platte, 1st, 16th; Red Willow, 7th, 16th, 17th; De Soto, 15th; Freemont, 15th; Clear Creek, 15th, 20th; Omaha, 15th, 20th; Genoa, 15th, 22d, 23d, 24th.

Nevada.—Pioche, 15th.

New Jersey.—Bordentown, 19th; Moorestown, 29th.

New York.—Kiantone, 18th.

North Carolina.—Weldon, 18th.

Ohio.—Westerville, 6th, 17th; Wauseon, 17th.

Pennsylvania.—Chambersburg, Philadelphia, 19th.

Wisconsin.—Beloit, 11th; La Crosse, 11th; Madison, 16th; Sussex, 16th; Manitowoc, 16th, 23d.

Wyoming.—Fort Washakie, 7th, 8th.

SNOW.

Snow has been reported by the following stations:

Fort Garland, Colorado, 8th: snow fell to a depth one and one-half inches.

Pike's Peak, Colorado, 2d, 3d, 5th, 8th, 9th, 11th, 12th, 16th, 17th, 25th.

Cheyenne, Wyoming, 8th.

Denver, Colorado: a heavy snow-storm prevailed throughout this part of the state on the 8th, which is a most unusual occurrence at this season of the year. The following stations in Colorado report the following concerning this storm:

Central City: snowing steadily since 7 a. m.

Black Hawk: snowing hard all day.

Georgetown: snowing all day; two inches on the ground.

Leadville: snowing all day.

Texas Creek: snowing and cold.

Alamosa: snowed for one hour during the afternoon.

Salida: snowed hard during the day and night.

SLEET.

Sleet was reported on the summit of Pike's Peak, Colorado, on the 24th and 29th.

Table of rainy and cloudy days, relative humidity, and dew-point for June, 1883.

Districts.	Rainy days.	Cloudy days.	Rel. humidity. *	Dew-point.
			Percentages.	°
New England.....	From 8 to 15	From 2 to 8	From 70.5 to 89.2	From 49.3 to 61.0
Middle Atlantic states.....	" 9 " 17	" 1 " 6	" 63.9 " 85.0	" 55.4 " 69.0
South Atlantic states.....	" 10 " 19	" 3 " 11	" 64.9 " 85.4	" 63.3 " 72.2
Florida peninsula.....	" 10 " 23	" 2 " 18	" 72.6 " 78.7	" 72.8 " 73.9
East Gulf.....	" 16 " 21	" 2 " 8	" 72.6 " 81.4	" 68.5 " 73.6
West Gulf.....	" 9 " 13	" 1 " 10	" 71.7 " 80.0	" 67.2 " 74.9
Ohio valley.....	" 17 " 20	" 4 " 11	" 66.5 " 73.9	" 58.2 " 64.2
Tennessee.....	" 12 " 16	" 2 " 5	" 71.6 " 74.0	" 63.7 " 68.6
Lower lakes.....	" 12 " 19	" 6 " 11	" 69.0 " 75.2	" 55.4 " 58.9
Upper lakes.....	" 14 " 21	" 3 " 13	" 69.6 " 77.8	" 46.1 " 55.3
Extreme northwest.....	" 7 " 14	" 4 " 6	" 67.6 " 72.1	" 50.3 " 53.0
Upper Mississippi valley.....	" 10 " 19	" 7 " 12	" 62.0 " 74.0	" 53.8 " 60.3
Missouri valley.....	" 10 " 16	" 1 " 7	" 68.7 " 72.0	" 54.2 " 60.9
Northern slope.....	" 9 " 17	" 1 " 8	" 46.5 " 71.5	" 36.1 " 56.0
Middle slope.....	" 7 " 15	" 2 " 6	" 50.6 " 70.2	" 44.7 " 58.9
Southern slope.....	" 4 " 9	" 0 " 6	" 42.4 " 62.5	" 47.5 " 63.8
Southern plateau.....	" 0 " 2	none	" 23.9 " 34.2	" 31.4 " 42.1
Northern plateau.....	" 2 " 9	From 2 " 6	" 44.8 " 70.9	" 32.7 " 47.9
North Pacific.....	" 2 " 3	" 3 " 4	" 55.6 " 62.2	" 46.0 " 48.9
Middle Pacific.....	" 0 " 2	" 0 " 5	" 36.8 " 81.9	" 47.9 " 56.4
South Pacific.....	" 0 " 3	" 0 " 3	" 51.6 " 75.8	" 58.2 " 65.1
Mt. Washington, N. H.....	Seventeen	Three	90.0	43.6
Pike's Peak Col.....	Eleven	Three	81.4	25.9
Salt Lake City, Utah.....	Five	Three	31.7	37.3

* Relative humidity corrected for altitude.

COTTON REGION REPORTS.

Temperature and rainfall observations in the cotton districts were continued during the month of June, 1883. The averages for the various districts, as determined from the observations made by the stations published in the REVIEW for April, 1882, are given in table below.

Meteorological Record of the Cotton Districts for the month of June, 1883.

Districts.	Average rainfall in inches.	Temperature.		Extremes.	
		Mean of the maxima.	Mean of the minima.	Highest.	Lowest.
New Orleans.....	8.65	90.2	71.7	103	45
Savannah.....	5.93	91.1	71.3	104	58
Charleston.....	4.77	90.4	68.9	100	55
Atlanta.....	2.88	88.8	66.8	101	48
Wilmington.....	7.30	88.8	66.5	101	49
Memphis.....	4.52	89.2	67.1	99	48
Galveston.....	3.48	93.1	72.6	103	60
Vicksburg.....	5.43	90.7	70.2	98	58
Montgomery.....	5.03	89.3	69.4	102	50
Augusta.....	5.25	90.3	69.0	102	51
Little Rock.....	3.52	90.0	67.2	99.5	46
Mobile.....	4.54	92.5	69.5	104	53

WINDS.

The prevailing directions of the wind for the month of June, 1883, are shown on chart iii. by arrows flying with the wind. In the Southern states, Ohio valley, lower lake region, and along the Atlantic coast the prevailing winds are from the south and southwest; in the upper Mississippi and Missouri valleys they are from the north and northwest; in the northern slope they are from the west and southwest; in the north Pacific coast region, from northwest, and on the California coast they are westerly.

HIGH WINDS.

On the summit of Mount Washington, New Hampshire, maximum velocities of fifty miles or more per hour occurred as follows: 64 nw., 1st; 72 nw., 4th; 80 nw., 5th; 56 nw., 6th; 58 nw., 8th; 72 s., 10th; 80 w., 11th; 128 nw., 12th (maximum for month); 80 nw., 13th; 90 nw., 14th; 64 s., 18th; 66 sw., 19th; 56 sw., 20th; 72 se., 28th; 60 nw., 29th; 72 w., 30th. The following high velocities were reported from Pike's Peak, Colorado: 53 nw., 1st; 50 sw., 3d; 54 nw., 4th; 60 w., 5th; 66 w., 10th; 72 w., 11th; 52 w., 12th; 52 sw., 13th; 80 sw., 14th (maximum for month).

Other stations reporting velocities of fifty miles or more per hour are as follows: Eagle Rock, Idaho, 52 s., 4th; North Platte, Nebraska, 90 sw., 16th; Dodge City, Kansas, 56 sw., 1st; Fort Elliott, Texas, 52 s., 16th; Cape May, New Jersey, 50 nw., 27th.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	8,850	Eastport.....	4,243
Middle Atlantic states.....	Del. Breakwater, Del.....	9,617	Lynchburg, Va.....	2,283
South Atlantic states.....	Portsmouth, N. C.....	9,582	Augusta, Ga.....	2,547
Florida peninsula.....	Cedar Keys.....	7,010	Sanford.....	3,485
East Gulf.....	Pensacola, Fla.....	5,755	Montgomery, Ala.....	3,556
West Gulf.....	Indianola, Tex.....	7,853	Little Rock, Ark.....	2,477
Ohio valley.....	Louisville, Ky.....	5,289	Cincinnati, Ohio.....	3,737
Tennessee.....	Nashville.....	4,317	Memphis.....	2,997
Lower lakes.....	Buffalo, N. Y.....	6,654	Erie, Pa.....	4,855
Upper lakes.....	Grand Haven, Mich.....	6,915	Duluth, Minn.....	4,083
Extreme northwest.....	Bismarck, Dak.....	6,094	Saint Vincent, Minn.....	5,424
Upper Mississippi valley.....	Davenport, Iowa.....	5,984	Dubuque, Ia.....	3,833
Missouri valley.....	Huron, Dak.....	6,739	Omaha, Neb.....	2,255
Northern slope.....	Fort Assiniboine, Mon.....	7,821	Helena, Mont.....	4,387
Middle slope.....	Dodge City, Kans.....	9,536	Denver, Colo.....	3,564
Southern slope.....	Fort Concho, Texas.....	7,202	Colman City, Texas.....	4,556
Southern plateau.....	Fort Apache, Ariz.....	5,941	El Paso, Tex.....	3,700
Middle plateau.....				
Northern plateau.....	Spokane Falls.....	4,144	Lewiston, Idaho.....	1,952
North Pacific.....	Portland, Oregon.....	3,806	Roseburg, Oreg.....	2,900
* Middle Pacific.....	San Francisco, Cal.....	9,158	Red Bluff, Cal.....	5,478
South Pacific.....	San Diego, Cal.....	4,792	Yuma, Ariz.....	3,783

* No record at Cape Mendocino, Cal.

On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 24,570 and 14,684 respectively. At the former station 2,050 miles were recorded during the twenty-four hours ending at 11 p. m. of the 12th, which is the largest daily movement recorded at that station since its establishment in September, 1871.

LOCAL STORMS.

Arkansas.—Watalula, Franklin county: a very severe wind-storm passed over portions of Franklin and Johnson counties during the evening of the 12th. At Watalula, the storm was very severe, destroying fences and outbuildings along the Mulberry valley. The windstorm was succeeded by very heavy precipitation, causing the streams to rise to great heights. Between 1 and 7.30 p. m. five successive storm-clouds, accompanied by torrents of rain, passed over this section. The Mulberry river valley, a fine agricultural region, was entirely submerged, totally ruining the growing crops. The damage sustained by the farmers in this vicinity is estimated at \$100,000. In the White Oaks valley, wheat fields ready for harvesting were ruined, and much fencing was destroyed. The corn and cotton fields were cleanly swept, and in many places the soil was badly washed and the fields were covered with sand and debris.

Dakota.—Pierre, Hughes county: the most severe wind-storm of the season passed over this place on the night of the 21st, blowing down several buildings.

Georgia.—Elberton, Elbert county: a tornado passed over this place on the afternoon of the 22d, blowing down a number of buildings and causing other damage.

Illinois.—Mount Vernon, Jefferson county: a violent wind-

storm occurred at this place on the afternoon of the 6th. No serious damage was done in this city, but in the suburbs, trees and fencing were blown down.

Carrollton, Greene county: a very heavy wind and rain storm occurred at this place, on the afternoon of the 8th. The storm continued for about three hours, and was accompanied by a slight fall of hail.

Springfield: a heavy storm of wind and rain struck the western part of this city, at about 8 p. m. of the 8th. Several houses were unroofed, and barns and fences were blown down. Reports from Bluffs, Chapin, Jacksonville, Berlin, and other points along the Wabash railroad, state that the rain accompanying this storm was the heaviest that has fallen at these places for several years, and that much damage has been done to crops.

Cairo: reports from Williamson county state that, between 9 p. m. and midnight of the 9th, a tornado passed through the southwestern part of that county, causing much damage to orchards and fences. The track of the tornado was about one-fourth of a mile in width.

Harvard, McHenry county: a tornado passed a short distance southeast of this place on the evening of the 11th, destroying dwellings, barns, and fences.

Lebanon, Saint Clair county: about 10 a. m. of the 15th, a tornado-cloud was observed approaching this place from the northwest. Before reaching here the cloud separated into two parts, one passing north and the other south of the city. The approach of the storm caused great alarm to the citizens but no serious damage resulted.

Decatur, Macon county: in this vicinity, during the storm of the 17th, many trees were blown down and buildings unroofed.

Oakdale, Washington county: the storm of the evening of the 20th caused much damage in this county to fences, trees, and crops. At this place the roof of a church was blown off.

Carmi, White county: during the night of the 21st and 22d a terrific rain and wind-storm passed over this locality. Considerable damage was done to the growing crops and to the unharvested grain. Fruit trees and buildings were blown down and stock killed. The fallen trees on the railroads caused delay of trains.

A severe storm occurred in Jackson county on the 23d; it was accompanied by a remarkably heavy rainfall, which caused a large amount of damage by washing away bridges and culverts.

Indiana.—North Vernon, Jennings county: a severe storm passed through the southern part of this place during the night of the 10-11th, destroying several houses and one brick church. A train on the Ohio and Mississippi railroad was blown from the track about seven miles east of this place. At Osgood, Ripley county, several houses were blown down, and two persons were reported to have been killed.

Iowa.—Council Bluffs: at 6 p. m. of the first, a very severe rain-storm visited this vicinity. Indian creek, which runs through this city, overflowed its banks; seven iron bridges and two stone culverts were swept away, and also several dwellings and barns along the creek. All business houses on Main and Broadway streets were flooded, and several losses of life were reported. The damage is roughly estimated at \$200,000.

Brush Creek, Fayette county: at 3 p. m. of the 11th, a tornado struck this place, destroying about one-third of the town. The losses are estimated at from \$30,000 to 40,000.

Elkport, Clayton county: a tornado occurred at this place on the 11th, demolishing several buildings. The tornado was preceded by a heavy fall of hail.

Kansas.—El Dorado, Butler county: a heavy rain storm visited this locality on the night of the 5-6th, causing much damage to crops by flooding the low-lands.

Topeka: the storm which occurred during the night of the 5-6th, was unusually severe. Hail caused considerable damage in the northwestern counties.

Fort Riley, Davis county, between 9 and 10 p. m. of the 11th, a heavy storm of wind and rain passed over this place,

unroofing buildings and causing much damage to trees and fences.

Abilene, Dickinson, county: a severe storm of rain and hail occurred about twelve miles north of this place at 10 p. m. of the 11th, and caused much damage. The village of Industry, in Clay county, was almost totally destroyed, every house but two having been blown down.

Valley Falls, Jefferson county: a severe storm passed over this place at 1.45 a. m. of the 12th. Many buildings at this place and in surrounding localities were damaged.

Atchison: at 12.30 a. m. of the 23d, this city was visited by a severe storm of wind and rain. The sewers and culverts were overflowed, and much damage caused by flooding cellars.

Massachusetts.—**Boston:** a severe storm passed over this city at about 5 p. m. of the 29th. The storm approached from the southwest, and was the most violent that has occurred here since the storm of July, 1879. It was accompanied by hail and torrents of rain. Considerable damage was done throughout the city and vicinity.

Michigan.—**Muskegon, Muskegon county:** this vicinity was visited by a severe wind and hail storm on the morning of the 2d. The smoke-stacks of several mills, and trees were blown down, and other damage done.

Detroit: reports from Van Buren county state that a heavy rain storm visited that section on the afternoon of the 17th, badly washing the roads and fields and sweeping away bridges.

Mississippi.—**Baldwyn, Lee county:** between 6 and 7 p. m. of the 6th, a very remarkable fall of rain occurred at this place. The day had been warm, and during the afternoon two masses of dense cumulus clouds approaching from nearly opposite directions met over this place. As they commingled, blinding sheets of water were precipitated. The area of the storm extended east and west about three and one-half miles, and north and south about five miles. The amount of rainfall during the storm, which lasted about forty-five minutes, is estimated at more than 9.00 inches.

Missouri.—**Carrollton, Carroll county:** a severe storm visited this place on the 12th, but caused no damage.

Springfield: the rain-storm of the 9th caused damage estimated at \$50,000 in this locality. Over 50,000 feet of lumber and a bridge were washed away.

Jefferson City: on the evening of the 9th this section was visited by a very severe and destructive storm. Buildings were unroofed and several railroad bridges were blown down. On the afternoon of the 22d this city and vicinity were visited by another severe storm. It came from the north, striking the Missouri river near Cedar City, in Callaway county. At Jefferson City the storm caused serious damage to buildings, fences, and trees.

Columbia, Boone county: this city was visited by a destructive storm at 11.30 a. m. of the 22d. A large number of buildings in this vicinity were damaged. Reports from surrounding localities state that fences were swept away and great injury done to farm-houses and grain.

Booneville, Cooper county: a violent storm occurred at this place about 12.30 of the 22d. The storm approached from the north and west, and continued for more than thirty minutes. Serious damage was done to buildings in this locality.

Chillicothe, Livingston county: a severe storm visited this section on the 12th, causing much damage. At Utica a brick church was demolished, and at Sumner City, eleven buildings were destroyed. On the evening of the 20th, a violent storm passed over the southwestern part of this county. The storm began at about 9 p. m., and continued for two hours. Its general course was from west to east. The damage to buildings and crops is very great. The fields were strewn with household goods and debris of various kinds. The width of the storm-track was about one and one-half miles, and was sharply defined along its course. Two persons were killed and several injured. Damage to the extent of \$20,000 was done in this locality.

Sedalia: between 12 m. and 1 p. m. of the 22d, a violent

wind and rain storm prevailed at this place, during which several buildings in this city were damaged.

Nebraska.—**North Platte:** a violent storm occurred on the evening of the 16th, during which a wind velocity of ninety miles per hour was recorded. Light buildings, chimneys, awnings, &c., were blown down. Hail accompanied the storm, and caused damage to windows and skylights.

Omaha, 17th: reports from the northern and western parts of the state show that a severe storm prevailed on the night of the 16-17th, causing much damage to property and almost entire suspension of railway traffic. At Neligh, on the Sioux City and Pacific railroad, a number of buildings were blown down and several persons injured.

Lincoln: the heavy rain storm of the night of the 22d, caused washouts on the railroads running southward from this city. Near Atchison and also at Sterling, several small breaks occurred.

Millard, Douglas county: during the early morning of the 23d, a tornado struck this village, causing great destruction of property. A new dwelling was lifted from its foundation and carried a distance of thirty-two feet. Many barns and orchards in this locality were seriously injured. The storm moved from northwest to southeast.

New Jersey.—**Bordentown, Burlington county:** during the storm of the 19th, buildings were damaged to a considerable extent and large trees uprooted.

New York.—**Menand station (near Albany):** a very heavy rain storm occurred at this place on the 6th, causing much injury to gardens and roadways.

Albany: a severe storm occurred on the afternoon of the 6th, causing damage estimated at \$50,000. Several objects were struck by lightning during the storm. Much of the damage done was caused by flooding cellars and basements.

Rochester: during the storm of the 11th, a number of bathing houses were destroyed, and much injury was done to fruit and shade trees.

Kiantone, Chautauqua county: a severe storm occurred here on the 12th, unroofing buildings and prostrating trees and telegraph poles.

New York City: on the afternoon of the 13th, a storm of unusual severity visited Hempstead, Garden City, and adjacent parts of Long Island. Buildings were blown down and unroofed, and a number of persons were injured.

North Carolina.—**Wilmington:** a severe storm occurred on the 2d, during which the barge "Modoc" was capsized and sunk. Many trees were uprooted and telegraph lines damaged.

Ohio.—**Jacksonburg, Butler county:** during the storm which occurred on the evening of the 10th, a number of houses were unroofed in the western part of this county. In Wayne township serious damage was done to buildings and orchards.

Dayton: high winds with heavy rains prevailed on the 16th, causing much damage in this city and vicinity.

Millersburg, Holmes county: a severe storm visited this place on the afternoon of the 18th. Several houses were unroofed and many trees uprooted. The storm was accompanied by hail which did great damage to crops in that region.

Steubenville, Jefferson county: during the evening of the 18th, a severe storm passed over the northern part of this city, causing damage estimated at \$15,000.

Pennsylvania.—**Williamsport:** a very severe storm, accompanied by heavy rain and hail, visited the Muncy valley region on the evening of the 17th. A number of buildings were damaged, bridges over small streams were washed away, and a large amount of grain was destroyed. The track of the Reading railroad for a considerable distance was badly damaged. The storm passed into Northumberland county, where much damage was done to bridges, grain, and fruit.

Reading: during the night of the 7-8th, this vicinity was visited by a very severe storm, during which several houses were damaged by lightning. This place was again visited by a destructive storm on the morning of the 19th. Many fields were badly washed and a large quantity of grain was destroyed.

Penn's Manor, Bucks county: at 4 p. m. of the 19th, a very violent and destructive storm occurred in this vicinity. The storm came from the southwest, making its appearance suddenly, and was of about twenty minutes duration. Large numbers of dwellings and trees were blown down, and the railroads were blockaded with the fallen débris. The total loss caused by the storm is estimated at \$25,000.

Harrisburg: this city was visited by a very severe storm during the night of the 17th. Many buildings were unroofed and trees and telegraph poles prostrated.

Province of Ontario.—Chatham: during the afternoon of the 18th a severe wind and rain-storm passed over this section. An unfinished bridge across the Thames river was completely destroyed. Several trees were uprooted and other damage done.

Province of Quebec.—Saint Johns: a severe storm of rain and hail visited this section on the afternoon of the 6th. A number of houses were unroofed and a large amount of lumber was blown from the wharves into the river.

Tennessee.—Memphis: between midnight and 1 a. m. of the 23d a violent thunder-storm passed over this city; no serious damage was reported.

Texas.—Greenville, Hunt county: a severe storm occurred at this place on the night of the 2-3d, causing damage estimated at from \$50,000 to \$70,000. One person was killed and several injured.

McKinney, Collin county: a tornado occurred west of this place on the evening of the 9th, which caused much injury to crops. The path of the tornado was about one hundred and fifty yards wide. At this place a heavy hail storm occurred, the hail-stones being of unusual size.

West Virginia.—Martinsburg: a very severe and destructive storm passed over this locality at about 4 p. m. of the 9th. It continued for forty minutes, causing great damage in the immediate vicinity to fruit trees and other property. The estimated loss is about \$5,000.

Wisconsin.—Fond du Lac, Fond du Lac county: a severe wind and rain storm visited the southern part of this county at 6 a. m. of the 2d. In the immediate vicinity of this city very little damage was done, but at Oakfield, nine miles south, the storm was more destructive. About one hundred and fifty barns in this county were destroyed. The loss to property in this county, aside from the damage to crops, is estimated at \$50,000.

Brandon, Fond du Lac county: a severe storm passed over this village on the morning of the 2d. The most serious damage done was to the shade trees and orchards. Numerous buildings were unroofed and sheds and light outbuildings were blown down.

Port Washington, Ozaukee county: a severe storm passed over the northern part of this county between 6 and 7 a. m. of the 2d, causing a large amount of damage. Over two hundred buildings were destroyed in the towns of Belgium and Fredonia, at which places the storm raged with unusual violence.

Necedah, Juneau county: during a severe storm, on the morning of the 2d, a part of the bridge over the Wisconsin river, three miles east of this place, was carried away, entailing a loss of 4,000. Buildings and crops in Adams county were damaged to a considerable extent.

Elmo, Grant county: a violent storm occurred at this place on the afternoon of the 11th. A freight train on the Galena division of the Chicago and Northwestern railroad was lifted from the track. A large amount of damage was done in this vicinity.

Beloit, Rock county: a violent storm occurred at this place at about 6 p. m. of the 11th. A large number of houses were unroofed and great damage was done to the mills and factories along the water power. The water in the river rose very rapidly, flooding many cellars. The bridge of the Chicago and Northwestern railway was totally destroyed. Three persons were reported to have been killed. The damage caused by the storm is estimated at \$100,000.

LOW TIDES.

Indianola, Texas, 24th, 26th, 27th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for June, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 85.10 per cent. The percentages for the four elements are: weather, 85.04; direction of the wind, 84.73; temperature, 85.27; barometer, 85.39 per cent. By geographical districts, they are: For New England, 85.24; middle Atlantic states, 86.62; south Atlantic states, 90.01; eastern Gulf, 85.08; western Gulf, 82.84; lower lakes, 81.46; upper lakes, 85.55; Ohio valley and Tennessee, 85.99; upper Mississippi valley, 85.70; Missouri valley, 82.39.

There were sixty-two omissions to predict out of 3,600, or 1.72 percent. Of the 3,538 predictions that have been made, one hundred and sixty-nine or 4.78 per cent., are considered to have entirely failed; eighty-seven or 2.46 per cent were one-fourth verified; four hundred and eighty-one or 13.59 per cent., were one-half verified; two hundred and nine or 5.91 per cent., were three-fourths verified; 2,592 or 73.26 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

The following percentages of verifications are for the month of August, 1882, which were not published in the REVIEW for that month:

The detailed comparison of the tri-daily indications for August, 1882, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentages of verifications to be 84.6 per cent. The percentages for the four elements are: weather, 91.0; direction of the wind, 84.4; temperature, 80.8; barometer, 81.6 per cent. By geographical districts they are: for New England, 84.1; middle Atlantic states, 84.9; south Atlantic states, 87.1; eastern Gulf, 86.5; western Gulf, 86.7; lower lakes, 86.9; upper lakes, 82.5; Ohio valley and Tennessee, 84.9; upper Mississippi valley, 79.9; Missouri valley, 80.7; north Pacific, 88.9; middle Pacific, 98.2; south Pacific, 99.1. There were one hundred and twenty-three omissions to predict (nineteen being due to the absence of reports from the Pacific coast) out of 3,813, or 3.2 per cent. Of the 3,690 predictions that have been made, one hundred and fifty-four, or 4.2 per cent., are considered to have entirely failed; one hundred and nine, or 2.9 per cent., were one-fourth verified; four hundred and fifty-six, or 12.4 per cent., were one-half verified; four hundred and ten, or 11.1 per cent., were three-fourths verified; 2,561, or 69.4 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During June, 1883, fifty-one cautionary signals were displayed. Of these, forty-one, or 80.39 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. No cautionary off-shore signals were ordered during the month. Three signals were ordered late.

One hundred and thirty-eight winds of twenty-five miles or more per hour were reported for which no signals were ordered; many of these were high local winds or strong sea breezes.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the lower Missouri river, and in the Mississippi in the vicinity of Saint Louis, the water rose above the danger-line during the latter part of the month. The Missouri, at Leavenworth, Kansas, reached its highest stage on the 26th, when it was five inches above the danger-line.

The Mississippi, at Saint Louis, Missouri, was above the danger-line from the 17th to the end of the month. The highest stage occurred on the 25th, on which date the water was